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This publication contains information regarding new developments of interest to agriculture based on laboratory and field investigations by the Du Pont Company. It also contains published reports of investigators at agricultural experiment stations and other institutions as related to the Company's products and other subjects of agricultural interest.

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INSECT CONTROL IN CLOVER AND ALFALFA

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Application of insecticides to forage crops, especially alfalfa and clover, is relatively new. This practice is growing in importance, not only to help produce increased yields per acre, but to improve the quality of the forage -- so that it may be used by the dairyman to replace part of the grain ration for his heifers and cows. This is of particular interest at this time when grains are high in price, and in view of predicted decreased production for 1952-53.

The key to improved forage yields and quality lies in the protection of the leaves, where both protein and carotene are more concentrated than in the stems or heads. Injury to leaves by chewing or sucking insects, therefore, reduces both yield and quality.

The principal insects which attack forage crops east of the Mississippi River are the spittlebug and the leafhopper.

The spittlebug causes widespread injury throughout the mid-West and some of the Northeastern states. In this area it has caused heavy damage to clover and alfalfa in the past few years. Since its injury is of an insidious nature, its extent is often not realized until treated fields are compared with non-treated fields.

The leafhopper is generally present wherever alfalfa and clover are grown east of the Mississippi. It lowers the vigor of the plants, but the damage is not spectacular or readily noticed, except by the decrease in yields which it causes.

Injury from both spittlebug and leafhopper has been severe in some sections during the last few years, but as mentioned before, protection from injury is only one aspect of forage spraying. There are benefits over and above a simple lack of insect damage to be derived from forage spraying.

Importance of Good Quality Forage

Pasturage and hay have become more valuable since the price of ground grain feed concentrates has increased. The value of forage has increased mainly by recognition of the fact that good quality forage, grown on the farm, can serve as a supplement for lighter grain rations. When cows have access to all the good quality forage they can eat, the feed bill can be greatly reduced.

Much progress has been made along the lines of improved legume strains and better pasture fertility programs, but only recently has it been recognized that insecticide applications can contribute to higher yields and better quality forage.

Emphasis is placed on the quality of the forage because ordinary hay does not have enough nutritive value neither does it provide a proper balance of diet for use in the dairy. On the other hand, dairymen who have depended on ground grain feeds for top production of milk are finding that it is possible to cut grain rations and increase the ration of high quality forage, and at the same time produce more milk, at less cost per fluid pound.

Real Pressure on Grain Supplies

Our eating habits -- as well as our growth in population -- have also had a decided effect on the pressure for grain supplies.

There has been a change in the type of food consumed in the United States in the last 40 years. People no longer eat the quantities of starch-containing foods that they did in years past. Instead, the demand seems to be higher than ever for foods of livestock derivation. The following table shows the change in the nation's eating habits:

CONSUMPTION OF FOOD, PER CAPITA PER YEAR, IN POUNDS

	Meat Poultry, And Fish	Potatoes And Sweet Potatoes	Grain Products	Dairy Products Except Butter	Leafy Green & Yellow Vegetables	Other Vegetables and Fruit
1910	154	206	294	367	73	204
1925	148	160	232	381	81	210
1940	149	138	198	391	104	234
1949	159	116	173	429	111	235

By studying the above figures, we can see the change in the nation's food habits. The total energy value of our yearly food intake hasn't changed much over the years, but the growth, "body repair" and energy-per-unit values have increased. We eat about as much meat as ever, but have turned away from potatoes and bread to milk and vegetables. Fruit has remained almost constant.

The first table points out a change in the type of food eaten, but does not consider total quantity. This figure has changed, too, since the number of mouths to be fed has increased tremendously.

POPULATION OF UNITED STATES

1910	92,000,000
1940	131,000,000
1950	151,000,000

Thus, although the amount of meat eaten per person has not changed greatly since 1910, the total amount produced has gone up by over 60%. The dairy products output is even more impressive, since the increase has been about 93%.

The important fact, however, is not that our meat and dairy food production has skyrocketed in 40 years, but that it has all been produced on about the same amount of land.

	Pastures in Farms (Millions of Acres)	Other Pasture And Grazing Land (Millions of Acres)	Total
1910	284	600	884
1925	331	495	726
1940	461	382	843
1945	529	292	821

The "Total" column (right, above) shows that we have not added to our productive acres to get the high protein and fat foods. The same amount of land is doing all the work; the carrying capacity of forage lands has been boosted.

The column "Pastures in Farms," (left, above) shows how an increasing number of pastures have been incorporated into farms. The trend has been one of building up the land with fertilization, special legume crops, and other care. But, just as there are natural and man-made factors that can increase the productiveness of the land, there are natural forces that counteract improvement. Insects are the No. 1 natural enemy, long since recognized as such on cultivated crops and more recently in some localities on forage crops. Production can be increased only so high by cultural practices. With the increasing pressure to supply more meat and milk from the same acres, authorities now recognize that more food can be gained from forage land through insect control.

Use of Insecticides on Forage Has Paid Well

Enough experience with spraying of forage crops is already available to show that it more than pays for itself. In Pennsylvania, yields from commercial treatments in carefully conducted tests showed an average of 1,000 pounds of additional dry hay per acre was produced at the first cutting alone as the result of one application for control of spittlebug. More important, the protein check was higher, enabling dehydrators to meet the protein requirements of alfalfa meal. It is estimated that 75,000 acres of alfalfa and clover in Pennsylvania were sprayed in 1951, and in Ohio the total was 200,000 acres. Tests in other states have also showed increases in quality and yield.

On the basis of the work of several states, and on observations by Du Pont entomologists in various parts of the country, we feel that the forage spray dollar can return from three to four times its value in increased hay.

Insecticides which may be good for some purposes may not be satisfactory for use on alfalfa or clover. Any insecticide intended for use on forage must have

exceptional qualifications:

(1) It should control both spittlebugs (nymphs and adults) and leafhoppers, since these are the main pests east of the Mississippi River. It should control alfalfa caterpillar and alfalfa weevil as well. Efficient control at low concentrations is necessary.
(2) It should be safe to handle and apply.
(3) It should not leave a toxic residue on hay.
(4) It should not prevent use of the pasture for a long time after application.
(5) It should not cause off-flavor in crops that might follow forage.
(6) It should neither be secreted in milk nor stored in tissue.

Du Pont "Marlate" 2MR insecticide, an emulsion concentrate containing 24% technical methoxychlor (2 lbs per gallon) meets these rigid specifications. (To be safe we recommend that no field be pastured within seven days of application.) "Marlate" 50, 50% technical methoxychlor wettable powder, may be used as spray or dust but is not as easy to use in ground spray or airplane application equipment as "Marlate" 2MR.

SURVEY OF FEDERAL REPORTS SHOWS CHEMICAL ADDITIVES SAFE IN FOODS

Despite some attempts "to stampede the American public" on the question of chemicals in foods, a survey of federal reports from 1939 through 1948 shows no single death from the use in or on foods of chemicals intended for such a purpose.

Dr. John H. Foulger, director of Du Pont's Haskell Laboratory of Industrial Toxicology, reported this in a recent speech in New York City.

In that period, the reports of the Food and Drug Administration showed 68 deaths due to chemicals in foods. Dr. Foulger said that an analysis of the data disclosed these interesting facts:

"One death was due to rat poison accidentally added to gravy thickening;

"Two were due to mistaken use of a cement sealing compound in mistake for vegetable oil;

"Two followed deliberate addition of arsenic to soup with intent to commit murder and suicide;

"Two occurred when a mixture of sodium and potassium nitrites was used in mistake for common salt;

"Sixty-one followed use of sodium fluoride in mistake for baking powder, flour, or milk powder.

"Actually, so far as the reports show, no single death is known to have resulted, in the period surveyed, from the use in or on foods, of chemicals intended for such a purpose," he added.

(continued on page 44)

USERS OF DU PONT PRODUCTS PROTECTED BY INDUSTRIAL TOXICOLOGY LABORATORY

New and expanded quarters for the Du Pont Company's Haskell Laboratory of Industrial Toxicology are under construction near Newark, Del.

Ground was broken in December, 1951, and the new $2,000,000 building is scheduled to be ready in 1953. Since it was established in 1935, the laboratory has been located at the Experimental Station in Wilmington.

Although Haskell Laboratory was the first of its kind in the chemical industry, it simply formalized a practice as old as the Du Pont Company itself: to do everything possible to eliminate potential hazards to employees, customers and the general public in the manufacture and use of chemical products. It rigidly tests Du Pont products and manufacturing processes to eliminate every potential hazard to employees and customers.

Scope of Laboratory's Work Enlarged

The new facilities have become necessary as this work has steadily expanded with the increase in the company's operations. The new laboratory will also enable the company to broaden its basic research on two major scientific questions: the causes of industrial fatigue and the factors that make clothing comfortable.

Work of the Haskell Laboratory is devoted to research on potential industrial hazards associated with Du Pont products and processes. Particular emphasis is placed on research that will reveal the very early physiological changes caused by the action of chemical compounds, in order that adequate preventive measures may be set up in the company plants. Information thus developed is used also to instruct customers on the safe handling of Du Pont products. In addition, results of fundamental studies undertaken in this laboratory are made available to other companies and to interested research workers in the fields of hygiene and medicine.

As a result of this work, some promising new products have been changed, or even abandoned, because of possible hazard to users. In other cases, manufacturing methods have been changed to protect employees.

Chemicals for Food and Agriculture Thoroughly Tested

All chemicals that have any connection with food are subjected to especially rigid tests. Some agricultural chemicals, which may leave a residue on food crops, are tested for a minimum of two years before they are released to the public. In this stage, some may be discarded by Du Pont because they are considered too hazardous.

Recently new and extremely promising miticides were shelved because their public health safety margin was considered too narrow.

DDT paint was discarded by Du Pont because it feared children who repeatedly touched surfaces painted with it and then put their fingers in their mouths might suffer ill effects.

Hydroxyacetic acid was ruled out as a cheap replacement for citric acid in soft drinks when toxicologists said there was a possibility bottlers might use too high concentrations with possible harm to the consumer.

Use of "Teflon" tetrafluoroethylene resin finishes as sanitary coatings for baking pans was approved only after exhaustive study showed the new plastic could not affect the food.

Effect of Fibers and Clothing on Consumer Tested

Before nylon was introduced commercially, it was skin tested first on guinea pigs, then on 200 humans, and finally a wear test was conducted on 5,000 people.

A special all-weather room at the new laboratory will enable researchers to extend and improve their techniques on one of the newer phases of its work: research on causes of fatigue among employees. It will also be used to assist the Textile Fibers Department in fundamental research on the basic factors of clothing comfort.

Weather available in this room will range from arctic to tropic. In it, scientists will be able to maintain temperatures ranging from 20 below zero to 150 above, plus wind velocities up to 20 miles an hour. Humidity will be accurately controlled. Thus, scientists will be able to create hot, muggy climates, stir up chilling breezes, plunge into dry desert heat, or stir up some frigid winter. With this control, they will be able to measure precisely the bodily changes caused by different atmospheric conditions in relation to types of fabrics worn by individuals. They will study such things as the effect of various fabrics on blood pressure, pulse, and perspiration of people under different conditions of climate.

This is a broad, fundamental program intended to discover why fabrics make people comfortable or uncomfortable. Du Pont researchers believe that, if they can make this discovery, they will be able to design clothing that will provide greater comfort under extreme conditions of heat and cold; that they will know how to make better fabrics and what fibers to use.

The new laboratory will be located on the site of The Stine Laboratory for animal medicine and nutrition of the Grasselli Chemicals Department, already being built near Newark, but will be a separate installation. This is on farm land on the Newark, Del.,-Elkton, Md., Road, about three miles from Newark and 16 from Wilmington.

NEW RECOMMENDATIONS FOR PLUM CURCULIO CONTROL IN NEW YORK

Three new organic insecticides are now recommended in New York State for the control of plum curculio instead of lead arsenate. They are parathion, EPN, and methoxychlor.

Two of these, parathion and EPN, are organic phosphorus compounds. Methoxychlor is a chlorinated hydrocarbon with a very low degree of toxicity to warm-blooded animals. Methoxychlor is recommended for use both in commercial and home orchards, while the other two are recommended only for use in commercial orchards.

"Lead arsenate is no longer recommended for peaches and plums because of the poor control and possible injury to trees, however it may be used on apples and cherries," according to a mimeographed bulletin issued in January, 1952, by Dr. E. H. Smith and Dr. E. H. Glass of the New York State Agricultural Experiment Station at Geneva, N. Y.

Suggested Spray Schedule

The New York researchers recommend the first spray at the time of shuck split. The chemicals should be used as follows: parathion as a 15% wettable powder at 2 lbs. per 100 gallons of water; or EPN in a 25% wettable powder at 1½ lbs. per 100 gallons; or methoxychlor in a 50% wettable powder at 3 lbs. per 100 gallons. They said that the phosphate materials EPN and parathion cannot be used on McIntosh and related varieties of apple without risk of injury.

The second spray should be made 10 days after the first, with the same dosage, and the third spray also of the same dosage, 10 days after the second spray. The third spray may generally be omitted in Western New York orchards.

Control of Plum Curculio

"For years," said the New York bulletin, "lead arsenate was the standard material for control of the plum curculio, and it may still be found satisfactory in light infestations." In heavy infestations, the new organic materials are recommended. Lead arsenate had the disadvantage of possible injury to peach and plum trees. The search for materials to replace it has been a long one. Hundreds of materials have been tested over the years. When DDT came into prominence, it was tried for virtually all insects. It was found to be highly effective against many of them, but not for the plum curculio. Lead arsenate, therefore, continued to be recommended by most experiment stations until the newer materials became available.

Methoxychlor, an analog of DDT and chemically known as 2,2-bis(p-methoxyphenyl) 1,1,1-trichloroethane, was developed in the laboratories of the Du Pont Company. It was first evaluated by Du Pont biologists in 1942, and became available commercially after the war. Used for a wide variety of purposes, its value for the control of plum curculio has been fully appreciated only in recent years.

Du Pont chemists first synthesized EPN -- technically known as ethyl p-nitrophenyl thionobenzenephosphonate -- in 1947, and it was introduced commercially in 1950. It has been found useful both as an insecticide and miticide.

How Plum Curculio Operates

The plum curculio is a chewing insect which has long bothered fruit growers. A native American species, Docters Smith and Glass said that it may have bred in wild plums and crab apples before cultivated fruits were brought over to the New World.

Although called plum curculio, this insect by no means restricts its field of activity to plums. The New York bulletin lists the plum, apple, cherry, peach, apricot, and nectarine as fruits which are severely attacked by it, and the quince and pear as fruits which are less affected by it. They describe this animal as follows:

"The plum curculio is an inconspicuous snouted beetle which overwinters as an adult insect in such protected locations as hedgerows and woods. In the spring as fruit trees are in bloom, these insects begin to emerge and fly to fruit trees. Here they feed and begin to lay their eggs in the small fruits as soon as they appear. A small crescent shaped scar is made by the female at the time of egg laying. This scar serves as an easy means of identifying the work of the pest. Eggs laid in apple and pear generally do not hatch, being crushed by the rapidly growing fruit. However, the egg-laying scar remains as a blemish on the fruit. In most stone fruits, the egg soon hatches into a small worm which commences feeding and burrows into the center of the fruit. Fruits injured in this manner drop to the ground, and in severe infestations, the entire crop may be lost in this way. Immature fruits drop for other causes, such as drought, poor pollination, etc. Drops resulting from curculio injury can be readily identified by the presence of the worm inside."

SURVEY OF FEDERAL REPORTS (Continued from page 40)

Industry and Government Cooperate

"There is no evidence that the present Food, Drug, and Cosmetic Act, operating with voluntary cooperation between officials of the Food and Drug Administration and experts of the food and chemical industries, has failed to protect the public against injury from chemicals in their food.

"To those enthusiastic supporters of the cry for new legislation who have tried to stampede sections of the American public by speeches or by magazine articles of doubtful factual accuracy and ridiculous arguments, we should point out that the apprehension or the actual fear which such speeches and articles engender can be a much more potent cause of both mental and physical illness than any chemical used in the production or processing or packaging of the nation's foodstuffs," Dr. Foulger said.

HIGH TAXES REDUCE DU PONT NET EARNINGS FOR YEAR 1951

With the highest production and sales in its 150-year history, but with unprecedented Federal taxes on income, Du Pont's net earnings in 1951 were 28 per cent lower than in 1950.

Sales of $1,531 million were $234 million, or 18 per cent higher than the previous record year of 1950. Net earnings of $221 million were $87 million less than in 1950.

The company's 1951 estimate of Federal taxes on income amounts payable under the Renegotiation Act was $371 million. Crawford H. Greenewalt, president of Du Pont, said in his report to stockholders that this is more than twice the total dividends paid to stockholders for the year and almost equal to salary and wage payments to all employees.

"While it is recognized that taxes must be high during the period of rearming for national defense," Mr. Greenewalt said, "it seems timely to inform the stockholders of the effect of high taxes on the company's operations."

Effect of High Taxes on Industrial Expansion

"For many years," the report continued," expansion of the company's productive capacity has been financed with funds derived largely from earnings retained in the business, and from increases in reserves. The enlarged demand for the company's products cannot be ignored and new productive facilities must be provided to the extent possible. However, the 'excess profits' tax bears heavily upon earnings available for financing new facilities.

"The 'excess profits' tax imposes a specific penalty on growth and efficiency by taking away most of the earnings from new operations and from technological improvements. This tax also invites inefficiency since tax savings are offered that in effect subsidize wasteful spending. Relaxation of cost consciousness is contrary to sound business principles at any time, but is particularly serious in time of national emergency, when maximum efficiency and productivity are at a premium."

Earnings applicable to each share of common stock were $4.64, compared with $6.59 in 1950. Common stock dividends paid during 1951 amounted to $3.55 per share as against $5.35 paid in 1950.

Expansion of Production and Research Facilities

Du Pont spent $135 million in 1951 to build new plants and to expand or improve existing ones. Substantial progess was made toward providing additional manufacturing capacity for nylon products, and for "Orlon" acrylic fiber. New capacities were completed, or were under construction, for "Dacron" polyester fiber,

neoprene, sodium cyanide, hydrogen peroxide, polythene plastic, tetraethyl lead, acetate yarn, titanium metal, fungicides, cellulose sponges, and "Ponsol" vat dyes.

Research expenditures during 1951, excluding cost of new facilities, totaled $47 million.

"As in past years," the report said, "the major portion of Du Pont's research effort is devoted to sustaining and improving the competitive position of present products and processes and to developing new products and processes. However, as total research expenditures have increased, greater emphasis has been placed on fundamental and long-range research as the soundest basis for diversification and strengthening of the company's business."

Du Pont's Relations With Small Concerns

Touching on the company's relationship with small business, the report said that Du Pont in 1951 sold its products to more than 75,000 customers and made purchases approaching $700 million from more than 30,000 suppliers. Most of these firms were small businesses. In construction, much work is subcontracted to others, mostly small contractors. In construction of the plant which the company is building for the Atomic Energy Commission near Aiken, S. C., for example, Du Pont has engaged 83 subcontractors, and has purchased from more than 3,600 firms, most of them small.

Du Pont's products, the report said, often are basic materials for smaller manufacturers who process the products, frequently adding value many times the price they pay for the materials. As an example, "Orlon" acrylic fiber, in only one of its uses -- home curtains -- goes to a dozen or so weavers, then to some 50 converters for dyeing and finishing, then to 150 curtain manufacturers, and finally to thousands of retail outlets.

This example, the report said," is representative of many Du Pont products and illustrates the relationship of businesses of all sizes in the American economy."

Increase In Employees and Stockholders

Employees numbered 86,874 at year-end, an increase of 2,279 since the end of 1950. Du Pont employees at government-owned plants numbered 19,997 at the end of the year. On December 31, 1951 there were 138,168 owners of the company's stock, an increase of 12,664 during the year. Of the total, 85 per cent were individuals, the remainder, groups such as estates, trusts, insurance companies, investment funds, churches, schools, and the like.

"Literally millions of people have an interest in these groups," the report says, "and through these groups have an indirect interest in the continued successful operation of the Du Pont Company."

Du Pont is introducing "Manzate" fungicide, a new chemical protector against fungous infections which annually take a heavy toll of tomatoes and potatoes. The new compound, described below, is also being tested for disease control on other crops.

NEW CHEMICAL HIGHLY EFFECTIVE FOR TOMATO AND POTATO DISEASES

A new organic chemical of high fungicidal value has been developed by Du Pont and found to be particularly effective in controlling fungous diseases which attack tomatoes and potatoes. It is manganese ethylenebisdithiocarbamate.

A wettable powder based on the new chemical has been given the trade-mark, "Manzate". It is being produced by the Grasselli Chemicals Department on a pilot plant scale, and only limited quantities are available in 1952.

"Manzate" fungicide is another in a series of organic plant protectant materials, based on derivatives of dithiocarbamic acid, which Du Pont agricultural research has brought out in the past 20 years. Its predecessors in the line of dithiocarbamates include "Arasan" seed disinfectant, "Tersan" turf fungicide, "Fermate", "Parzate", and "Zerlate" fungicides.

Although fungicides have not attracted the widespread attention that insecticides have received since the development of DDT, they do a vital job for farmers and fruit growers in fighting the ravages of fungi which appear as mildews, rusts, smuts, blights, scab, and rot of plants and seeds.

Field evaluations of "Manzate" indicate that it may eventually have a wide range of usefulness for some fruits, vegetables, and ornamentals.

"Manzate" Controls Early and Late Blights

"Manzate" was officially registered this spring. It is recommended for the control of anthracnose, gray leaf spot and Septoria leaf spot on tomatoes, and early and late blights on both tomatoes and potatoes.

As a chemical for the control of tomato diseases, "Manzate" fungicide offers a single product which is effective against all major fungous enemies of the tomato plant. Previously two or more chemicals have been required in alternate applications to control the various diseases which attack the tomato fruit

and foliage. This ability to rely on one material relieves the tomato grower of a critical problem in timing his sprays to effectively apply the right chemical at the right time to combat each disease.

As a potato fungicide, "Manzate" has proven particularly effective in cases where both early and late blights were equally severe at the same time.

The new fungicide has undergone extensive field testing for several years, both by Du Pont investigators and federal and state experiment stations. During 1951, more than 200 field tests in 32 states, Hawaii, Canada, and Mexico were carried out to evaluate the compound for disease control with such crops as tomatoes, potatoes, apples, cereal grains, cucumbers, squash, melons, celery, tobacco, roses, snapdragons, chrysanthemums, and a variety of other vegetables, fruit, and nut crops.

How "Manzate" Should Be Used

In many of the tests with "Manzate", it was found effective at spray concentrations of 1¼ to 2 pounds per 100 gallons of water.

In the case of potatoes, spraying should start as soon as the plants are 2 to 6 inches high, and continued at 5 to 10-day intervals as long as blights threaten.

For tomatoes, spraying should start when the fruit of the first clusters are well formed, and repeated at 7 to 10-day intervals. When weather conditions favor disease development, earlier and more frequent applications may be necessary.

"Manzate" fungicide is compatible with the common insecticides such as methoxychlor, DDT, organophosphorus compounds, nicotine sprays, rotenone, and pyrethrum.

Although "Manzate" fungicide has shown promise when applied as as diluted dust, its use in 1952 will be confined to spray applications.

RAPID RISE OF POULTRY INDUSTRY IN DELAWARE OUTLINED IN NEW BOOKLET

In 1900, Delaware produced no broilers. Fifty years later it was the leading broiler-producing state in the Union.

Layers on Delaware farms 50 years ago averaged only 68 eggs per year -- today they average 151.

In 1922-23, when the first tests for pullorum, (formerly called bacillary white diarrhea), were made in Delaware, 9.2 per cent of the reactions were positive. Today the average is down to 0.1 per cent and there are 469 pullorum-free flocks in the state.

These and other developments in the story of the poultry industry in Delaware are outlined in a booklet by A. E. Tomhave, research professor in the Department of Animal and Poultry Industry at the University of Delaware since 1921. Entitled "The Poultry Industry in Delaware During The Last 50 Years (1900-1950)", it was published by the University of Delaware at Newark, Del., in 1951 as the 24th in the series of "Delaware Notes." The rapid strides forward in Delaware's poultry business occurred since 1923, but a review beginning with the turn of the century brings developments into a better perspective.

Rise and Decline of Layer Business

There were 628,866 chickens on Delaware farms on January 1, 1900, according to the United States census figures, and the number rose steadily to over 2,000,000 in 1929 and 1930, after which the total declined to a little over a million, (exclusive of broilers).

Total egg production rose from 42,862,440 eggs in 1900 to 141,000,000 for 1949. "The increase was brought about," Mr. Tomhave says, "not only by the increase in numbers of birds but by the increase in eggs per bird." This was achieved "by the use of improved strains, better nutrition, and better management of the laying flocks. This increase in Delaware parallels the increase in the United States as a whole."

The decline in the egg business which set in around 1930 was due, Professor Tomhave says, to "the prevalence of 'range paralysis.'" This "created a problem in raising replacement stock which caused many producers to reduce operations." Since this disease is contracted by the birds only after an age at which they are sold as broilers, Professor Tomhave regards this as one of the many things which contributed to the change-over from layer to broiler production in Delaware.

Development of Broiler Production

Today Delaware produces more then 80,000,000 broilers per year -- an amazing fact when one realizes that before 1923 the state had no broiler production. The industry started at Ocean View, on the Altantic Ocean between the resort towns

of Rehoboth Beach and Bethany Beach. It is in Sussex County, the southernmost of the three counties into which Delaware is divided.

The interesting story of the start of what is now Delaware's leading agricultural business is related by Dr. Tomhave as follows:

"Credit for the beginning of the commercial broiler industry has been given to Mrs. Wilmer Steele of Ocean View. In 1923, she is reported to have started a brood of 500 chicks in the usual manner, growing replacement stock for the laying flock. But when the birds reached an average weight of about two pounds, she sold the remaining 387 for 62 cents a pound, live weight. The next year Mrs. Steele started 1,000 chicks which were later sold for 57 cents a pound live weight. The news of this profitable enterprise spread through Baltimore Hundred, and it is estimated that by 1925 there were 50,000 broilers grown in the area.

"For several years the general practice was to raise only one lot of birds each year, starting in February so they would be ready for market before the supply of farm-produced fryers and broilers were ready to be sold. Growers soon began to start a winter brood in November and another in February. Today, broiler chicks are placed in the broiler houses every week of the year."

Factors Contributing to Growth of Industry

Dr. Tomhave summarizes the principal factors which led to the development of the broiler industry as the "advancement in knowledge of poultry nutrition, the improvement of poultry equipment, especially incubators, the program of disease control and eradication in the state, the development of the 'know-how' of large-volume methods in the production of poultry meat, and the expansion of consumer acceptance of the product."

Why did the broiler industry thrive in Sussex County? Professor Tomhave recites the eight generally given reasons: "(1) a temperate climate, (2) cheaper building costs, (3) the fact that chicks can range all winter if desired, (4) lower labor and overhead costs, (5) lower fuel costs for brooding, (6) a porous soil which provides good drainage and aids in disease control, (7) relative proximity to markets, and (8) ready credit for financing operations."

By 1941, when Delaware production reached 48,000,000 birds, this constituted 27.8% of all the commercial broiler production in the United States. Other areas, however, also increased their production, so that Delaware's 71,881,000 birds in 1949 amounted to only 14.7% of the nation's production.

"In the early years of the broiler industry in Delaware," Mr. Tomhave says, "pure-bred Barred Plymouth Rocks supplied most of the chicks used by broiler growers. By 1935 Barred Cross chicks, resulting from the cross of the Barred Rock male on the New Hampshire female, were finding favor..... During the past few years, straight New Hampshire chicks have also been used in large numbers for broiler production. Several other meat-type birds, such as the Indian Cross, have been used....."

Disease Control and Research in Delaware

Since 1921, when the first appropriation for the control of disease was voted by the State Legislature, much progress has been made, Mr. Tomhave relates. "The pullorum disease eradication program in Delaware has been exceedingly successful. In the 1922-23 testing year, 1,034 birds were tested and 9.2 per cent were found to be positive. Ten years later 73,359 birds were tested and the positive reactors had been reduced to 3.9 per cent. In 1941-42 when a total of 337,000 birds were tested, reactors had been reduced to approximately one-tenth of one per cent."

The University of Delaware's poultry research and extension work in poultry began in 1925. In 1942, a broiler experiment substation was developed near Georgetown, in the heart of the Sussex county broiler region.

SECURITY COMES ONLY THROUGH OWN EFFORTS, DU PONT PRESIDENT SAYS

CHAMBERSBURG, Pa. – Security is the most worthy of man's desires but it is not an inherent right of citizenship, Crawford H. Greenewalt, president of the Du Pont Company, said here recently.

The goal of personal security is desirable, "even essential for each of us, and for the nation," Mr. Greenewalt declared and pointed out it was not the goal, "but the method of reaching it that is in question."

"Today a new theory seems to have found wide acceptance -- that personal security is in some way a right of citizenship," he said. "Should we not win it for ourselves, we acquire through government a first mortgage on the efforts of others. We seem well on the road to embracing the impractical philosophy that we can have what we do not earn.

Farmers Know How to Rely on Selves

"It seems odd that so fantastic a theory should have gained headway. Certainly no farmer would believe that he could increase his crops by merely wishing that it were so, or that if his crop failed he could go to his more thrifty neighbor and demand a share of his production. In simple communities such as we had here two hundred years ago such ideas would have been ridiculed.

"Whether our civilization is simple or complex, security comes only through our own efforts. We cannot have what we do not produce," he said.

"There is no free ticket to prosperity," Mr. Greenewalt asserted. "We get what we work for, directly or indirectly. If we rob Peter to pay Paul it is still robbery whether we do it directly, or whether we empower our government to do it on our behalf."

The fallacy is that the government owns property which it can distribute to the people. But "government owns nothing, produces nothing, and maintains

itself only through the taxing power." He recognized that high taxes are necessary to defend the nation, but criticized the methods of taxation, "with the sorry devices the taxgatherer uses to hide the impact and effect of his activities."

Tax Bill Often Concealed From Taxpayer

Pointing to studies showing that every citizen, rich or poor, pays about 25 per cent of his income in taxes, he said, "The trouble is that he does not know it, for the largest part of the bill has been concealed from him, and he goes on blithely thinking that the cost of government is being paid by his neighbor.

"The difficulty is that he has lost the basis for making an intelligent decision as to the course of action that is best for his own self-interest. For how can he exercise his privilege and responsibility as a voter if he does not see clearly the effect on his own well-being of the course of action on which he is asked to decide?"

Mr. Greenewalt said that the problem is not just one of political change. "It is," he said, "something that goes far deeper than that. It is a question of reaffirming the high moral standards to which we have held so strongly for so many years. It is a question of reexamining our faith in our republic and in the principles on which it is based. It is a question of intelligent inquiry, of examination and appraisal of the new proposals that are being made to us in the light of the principles for which we have stood."

S E E D T R E A T M E N T P A Y S

"What it costs in time, gasoline, machinery wear and hard work to plow and fit a new seed bed is only too well known.

"With all costs up, it is good insurance to take advantage of every practice that helps to produce a bumper crop. Seed and fertilizer, for instance, are more expensive than they were a decade ago, but if the seed fails to sprout or is killed after it germinates, the cost of the seed is lost as well as the labor and time that you have put on the crop. At least a portion of the fertilizer is also lost.

"There is no such thing as cheap seed, because the few dollars saved on the investment for it can mean many dollars lost by a poor yield or weedy conditions.

"But even the best seed in the best fitted piece of land has enemies that attack it, and that is why more and more of the seed you buy has been treated to control various diseases and decay organisms before you buy it.

"It is very important to check with your supplier to see whether the seed you purchase has been treated. If it has not, then you can do it yourself with relative ease and at low cost when you consider the insurance value of the treatment."

-- From the AMERICAN AGRICULTURIST, published at Ithaca, N. Y., December 15, 1951.

METHOXYCHLOR EFFECTIVE FOR STRAWBERRIES IN NORTHWEST

CORVALLIS, Oregon -- Increased strawberry production may result from modern methods of controlling two insect pests recently described by R. G. Rosenstiel, entomologist at the Oregon State College experiment station here.

The two insects are meadow spittlebug and omnivorous leaf tier. While their mode of attack differs, both devitalize the plant and cut berry production. They attack both green and ripe fruit, causing injured berries with an excess of seeds.

Following several seasons of experimental work, Dr. Rosenstiel reported excellent results in controlling both of these insects with methoxychlor. Classified by the Food and Drug Administration as the least toxic of the chlorinated hydrocarbon insecticides, methoxychlor can be applied up to two weeks before picking time.

How Omnivorous Leaf Tier Operates

Sometimes called the strawberry worm, or tie worm, the leaf tier gets its name from its ability to spin a silken strand from its mouth with which it actually "ties" berry leaves into a bag-like enclosure, inside which the insect larva feeds on the new growth.

Adults of this pest are tan moths which appear in June and early July, flying mostly just after sunset. The females lay eggs in crevices on the rough bark of trees such as oaks or Douglas fir, or on unpainted wooden buildings. These eggs hatch in about two weeks into tiny orange-colored larvae with black heads, about a thirty-second of an inch in length. The larvae crawl deep into cracks or other sheltering indentations in their wooden hatching place, spin a protective silken cover around themselves, and remain there for the winter.

In March, these larvae come out on the bark of their tree homes, attach a strand of their silk to the tree and leave, spinning a strand from their mouth as they go. If the wind is blowing, it whips the larvae away from the tree and they sail away trailing their silken thread, much like a parachutist. Once on the ground, these worms seek out nearby plants and at once start making long, narrow, twisting, brown tunnels into the leaf structure.

Spring Winds Can Carry Larvae Long Distances

As the tiny larvae feed, they grow to about a half-inch in length -- light cream worms with tan heads. Too large for leaf tunneling, they ascend to the tender growing tips of the plant, tieing the young leaves in protecting curls around them while they feed. Later, they tie down a petal or two of the strawberry blossom and feed on the developing fruit. As berries ripen they begin to feed at the point of greatest ripeness.

Removal of rough-barked trees from areas around strawberry plantings will help control leaf tier infestations. However, larvae may be carried long distances by strong Spring winds. Dr. Rosenstiel's recommendations for chemical

control call for two applications of a five per cent methoxychlor dust. First dusting should be about 15 days after Marshall strawberry blossoms first appear -- usually around the first of May in the Pacific Northwest. Second application should be about three weeks after the first one.

Methoxychlor May Replace Rotenone for Spittlebugs

In Northwestern strawberry fields, spittlebugs spend their winters as egg masses on stems and leaves of the plants. They hatch out as tiny, bright yellow bugs in late March and migrate to tender growing parts of the plant, where they start to feed by sucking out plant juices.

As the insect grows in this "nymph" stage, it excretes a liquid which is mixed with air to produce the familiar white froth or "spittle" which covers their bodies. In May the brown adult spittlebugs emerge from these froth masses and are to be found around strawberries until fall.

Besides weakening the plant and causing lower production of berries, spittlebug feeding on green fruit causes abnormal berries with shrunken sides and an excess of seeds, making the fruit of little commercial value.

Dusting of fields to control spittlebugs should begin soon after fruit spurs begin to appear on plants -- usually from the middle of April to the first of May. For many years, rotenone dusts have been recommended for this purpose, but due to the decomposition of this material in bright sunlight it has been necessary to dust every three to seven days (depending on the weather) to maintain good control of the pest.

In his recent tests, Dr. Rosenstiel reports that five per cent dusts of methoxychlor have not only done a good job of controlling spittlebug but will remain effective for three to four weeks, unless washed off by a heavy rain. "In the 1950 and 1951 seasons, one application of the (methoxychlor) dust gave excellent commercial control in field tests when it was timed properly and applied thoroughly," he stated.

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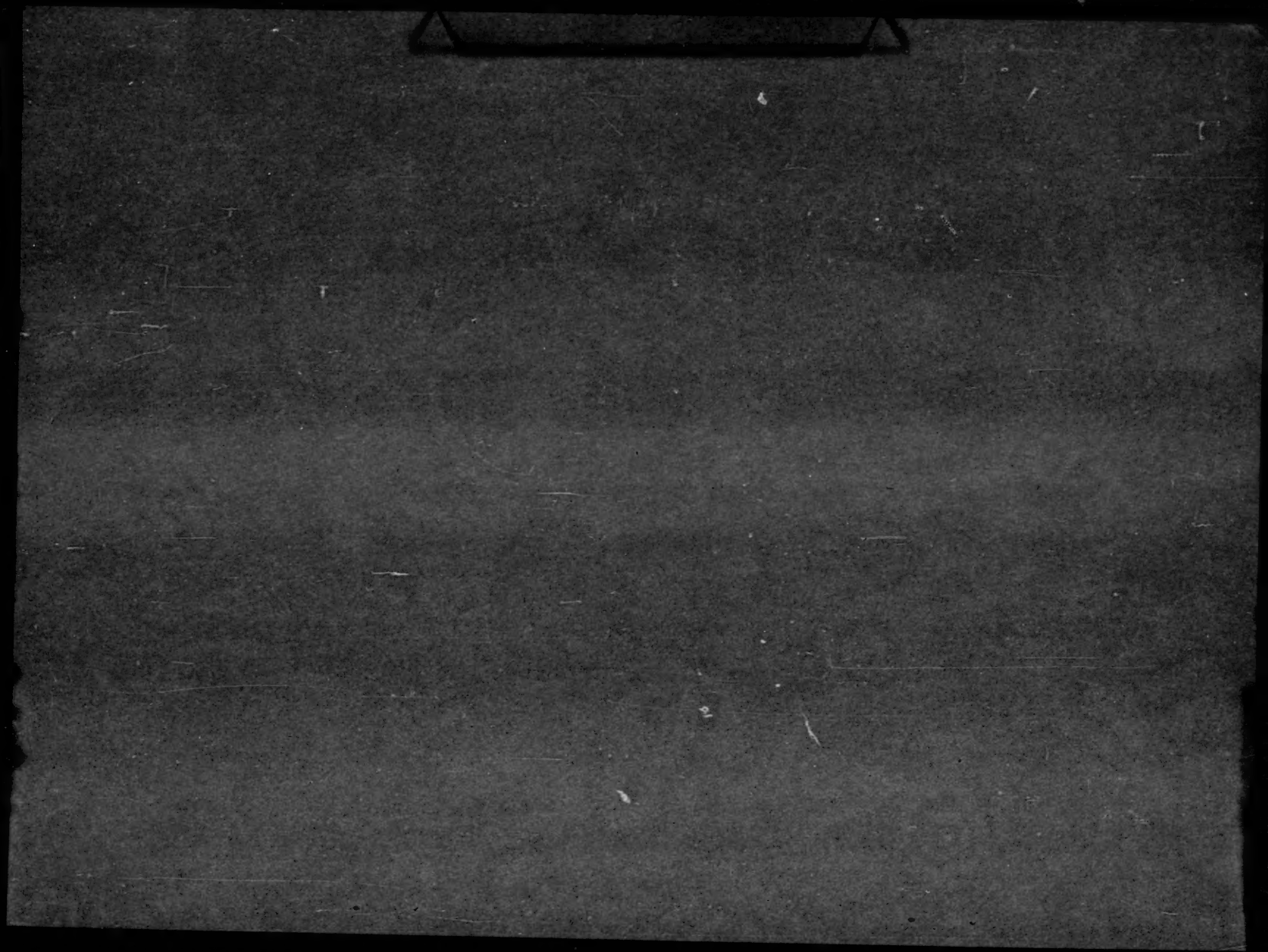

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